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Washington University Record, January 23, 1997

Record

WASHINGTON UNIVERSITY IN ST. LOUIS

Vol. 21 No. 17 Jan. 23, 1997

Using an instrument called "Betsy," Douglas A. Wiens, Ph.D., fires a shotgun blank into the ground at the Tyson Research Center last fall. The purpose of the experiment was to determine the structure of the rock beneath Tyson and map soil layers formed by past floods over geologic time.

Geophysics class takes to the field for hands-on research experience

For students of a bygone era, a gun called "Betsy" belonged to a frontiersman in a coonskin hat named Davy Crockett. But for students in last fall's "Earth and Planetary Sciences 454, Exploration and Environmental Geophysics," a gun called "Betsy" was an integral part of field experiments that made environmental geophysics fun and practical.

The modern-day "Betsy," though called a gun, is actually an instrument used to fire a shotgun blank into the ground to make seismic readings.

Taught by Douglas A. Wiens, Ph.D., and Roger J. Phillips, Ph.D., both professors of earth and planetary sciences in Arts and Sciences, the course is an elective in Washington University's Environmental Studies Program in Arts and Sciences.

Last fall, Wiens, Phillips and Patrick J. Shore, Ph.D., instructor and computer specialist in earth and planetary sciences, worked with the class of eight students. The class went to the Tyson Research Center and to a private quarry near Alton, Ill., to use "Betsy" for two field experiments. Using another geophysics instrument called a magnetometer, the faculty members worked with the students in Forest Park to search for remnants of the Ferris wheel from the 1904 World's Fair.

At Tyson, the class members surveyed a quarter-mile section of the research center's 2,000 acres for soil and rock-layer depths. They wanted to determine the structure of the rock beneath Tyson and map soil layers formed by past floods over geologic time.

Wiens and the students laid out on the grounds a network of 60-channel seismographs connected by cables. They used an auger to drill a 2-foot-deep hole in which "Betsy" was inserted. The vibrations from the shotgun blast traveled through Tyson's rock and soil layers and were picked up by the seismographs. This allowed the subsurface to be imaged, much like a sonogram is used in the medical sciences.

"The noise is quite impressive —

Continued on page 4

EM³ aims to turn professionals into next generation of managers

The first class in the executive master's of manufacturing management (EM³) program is indeed first-class.

The 16 students enrolled in the degree program — the first in the world developed exclusively for high-potential working manufacturing professionals — have impressive credentials. Twenty percent of them already have earned a graduate-level degree, and 69 percent have engineering backgrounds. Their average age is 40. They average 17 years of professional work experience.

Each course in the EM³ program, a collaboration between the John M. Olin School of Business and the School of Engineering and Applied Science, includes both business and advanced engineering perspectives.

Industry leaders on the EM³ advisory board helped create the curriculum with an eye toward maximum relevance and value. Their message was that the next generation of managers must be not only technically and technologically sophisticated but also able to work in groups and motivate others to do their best.

"EM³ is about collaboration — between business and engineering faculties, between industry and the University and among the professionals who are our students," said Dean H. Kropp, Ph.D., academic co-director of the EM³ program, associate dean in the business school and the Dan Broida Professor of Operations and Manufacturing Management.

Orientation for EM³ participants was Jan. 6-10 at the Innsbrook Estates Executive Conference Center in St. Louis. Regular classes begin Friday, Jan. 24.

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Exhibit captures grief over teen's death

The agony over a youth's life cut short — coupled with the beautiful artwork his memory inspired — forms the central theme in an upcoming Arts Connection/City Faces exhibit organized by Bob Hansman, assistant professor of architecture.

The emotionally charged drawings and poetry in the exhibit were created by Hansman and by other friends of Jermaine Roberts, a City Faces participant who died of sickle-cell anemia last May. The exhibit runs from Friday, Jan. 24, through March 29 at the Center of Contemporary Arts (COCA), 524 Trinity Ave. An opening reception is set for 6 to 8 p.m. Jan. 24. COCA sponsors the City Faces program, which is held at the School of Architecture each summer and is designed to teach drawing to at-risk youths.

Organizing the exhibit was uplifting and heartbreaking for Hansman, who shares the grief over the loss of 17-year-old Jermaine with other City Faces participants.

Jermaine, who was in Hansman's City Faces class three years ago and continued on in subsequent classes, was instrumental in the summer program's success. Jermaine served as a self-appointed bridge between the often-unruly teens and Hansman. Ultimately, under Hansman's direction and Jermaine's prodding, the youths not only learned to draw but also forged deep and continuing friendships with their teacher and with each other.

"Everybody respected Jermaine," Hansman said. "He was able to see the kids' side and my side and validate each side to the other."

The focal point of this year's City Faces exhibit has evolved into a shrine honoring Jermaine's memory. Eight pastel portraits of Jermaine created by his friends surround Hansman's woodblock print, charcoal and pastel work featuring a variation on Jermaine's self-portrait. The works tell a story of grief, love and healing.

This is a black-and-white reproduction of Bob Hansman's woodblock print, charcoal and pastel work featuring Jermaine Roberts.

"The big message of the show is that it reverses all the myths you hear about kids not caring," Hansman said. "People will drop to their knees when they see how much these kids loved Jermaine."

Distraught over Jermaine's death, Hansman was unable to create any art of his own for seven months. When he

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In this issue ...

University sets 1997-98 undergraduate tuition, fees

Undergraduate tuition and fees at Washington University will total $21,210 for the 1997-98 academic year — a 5 percent increase above the current academic year, according to Benjamin S. Sandler, treasurer of the University. This total includes a $210 required student activity fee.

Undergraduate tuition and fees for the current academic year (1996-97) total $20,200, which includes a $200 required student activity fee.

Tuition charges for graduate and professional schools and for several evening and summer programs also were announced.

Typical room and board charges for 1997-98 will be $6,516, up 4.9 percent from the current academic year's charges of $6,210. The total 1997-98 charge for undergraduates — tuition, fees and room and board — will be $27,726, which is 5 percent greater than the corresponding 1996-97 charge of $26,410.

"We strive to contain costs and to keep charges at a manageable level while working to improve the University's excellent academic programs. The financial reality is that these costs rise much faster than the Consumer Price Index at virtually all institutions of higher education," Sandler said.

Washington University is committed to a strong financial aid program. Nearly 60 percent of undergraduates receive some type of financial aid.

The University offers two payment plans to help lessen families' financial burdens. The Cost Advantage Plan allows University charges for all four years (or less) to be paid in monthly installments over as many as 10 years at competitive fixed interest rates. The advantage of this plan is that a family can lessen the effect

Continued on back page

Medical Update

Key link identified between cataracts and light exposure

Cataracts are a common cause of vision loss in older adults. About half of Americans ages 65 to 74 develop cataracts, and 70 percent of those older than 75 have them. They result partly from exposure to the ultraviolet B (UVB) rays in sunshine. School of Medicine researchers have identified a potentially key link between cataracts and light exposure. They also suspect that a new glaucoma drug might have the unintended effect of promoting cataracts.

A cataract is a clouding of the lens of the eye that obstructs the passage of light. Although cataract patients can be treated surgically, a better understanding of how cataracts form might lead to methods that prevent their development.

The researchers report that fatty acids called prostaglandins are involved in both the creation and the progression of cataracts. The researchers also report that they have prevented cataracts by inhibiting prostaglandin synthesis.

They also have found that one of the prostaglandins that resembles a new glaucoma drug might promote cataract formation. The drug, called latanoprost, can lower pressure in the eye and delay damage from glaucoma, but the researchers worry that it might have the unintended side effect of creating cataracts or increasing their severity.

Reporting in a recent issue of the Journal of Investigative Ophthalmology and Visual Science, a research team led by Usha P. Andley, Ph.D., assistant professor of ophthalmology and visual sciences and of biochemistry and molecular biophysics, confirms that exposure of rabbit eyes to UVB led to cataract formation. But the team also showed that, even in the presence of large doses of UVB, inhibiting prostaglandin synthesis prevented the cataracts. Andley is a Research to Prevent Blindness Robert E. McCormick Scholar.

> "We had known for many years that UVB rays are involved, but we did not know how they change the chemical makeup of the lens."
>
> **— Usha P. Andley**

"We had known for many years that UVB rays are involved, but we did not know how they change the chemical makeup of the lens," Andley explained. "We have shown in this study that prostaglandin synthesis increases in response to UVB radiation. We also showed that, when we inhibit prostaglandin synthesis, we prevent cataracts."

Andley's team is the first to show that inhibition of prostaglandin synthesis in the eye can prevent or lessen the severity of cataracts.

The researchers identified two particular prostaglandins activated by UVB radiation. The concentration of the first, called PGE2, increased 100-fold following UVB exposure. A second, called PGF2a, was present at 30 times its former concentration after the eye was exposed to UVB.

"Initially, we thought that PGE2 was our main problem because it was present in such large amounts," Andley said. "So to test that idea, we exposed eyes to high concentrations of PGE2 — concentrations similar to the level that would be created by UVB exposure. But when we added the PGE2, we did not create cataracts."

In fact, they learned that PGE2 had a protective effect. When the researchers treated eyes with PGE2 and exposed them to UVB, no cataract formed. Andley suspects PGE2 may be synthesized in large amounts to protect the lens from UVB exposure. PGF2a, however, increases the severity of cataracts.

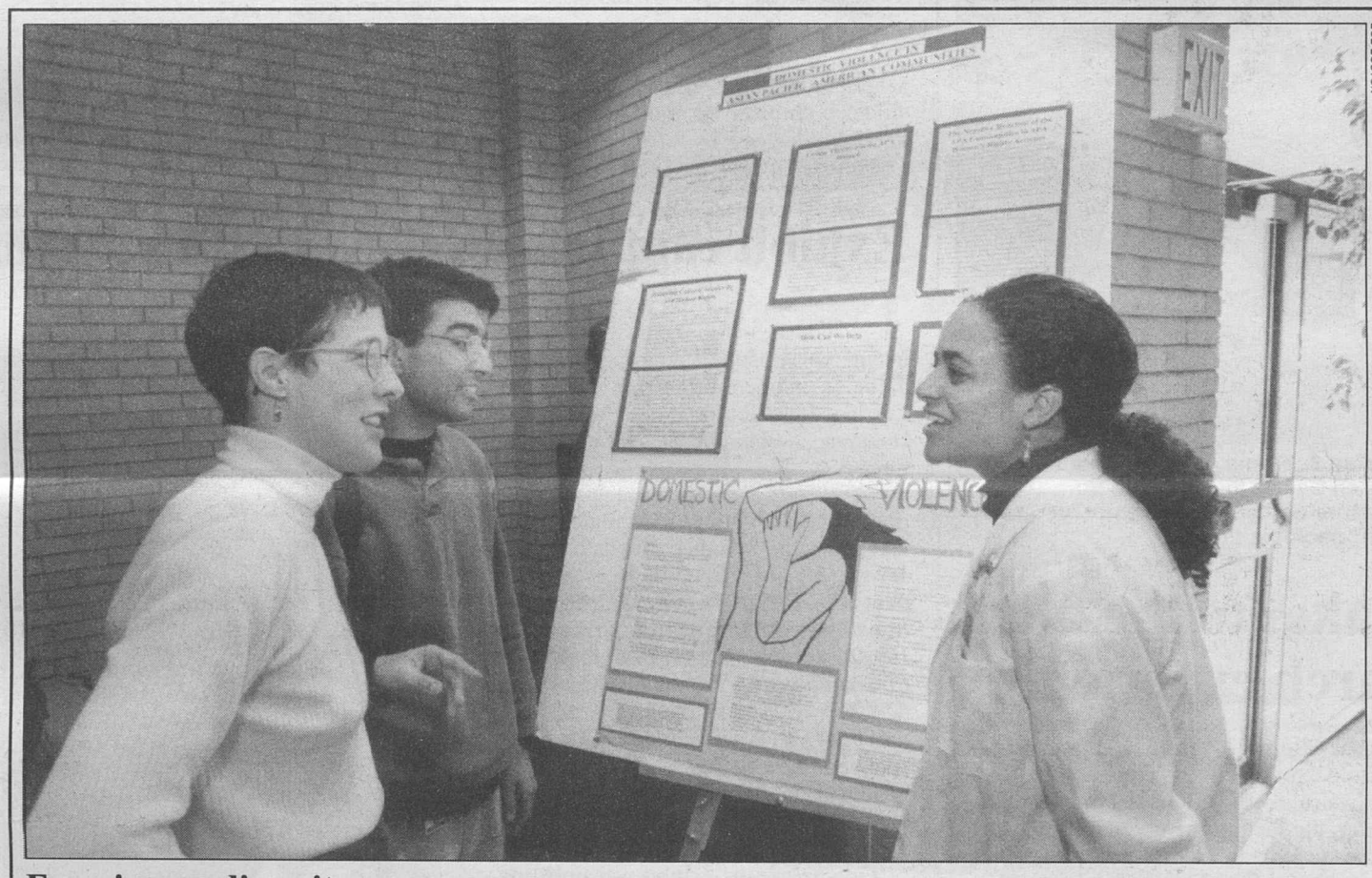
"In this model, it was clear that PGF2a was the real culprit," said Bernard Becker, M.D., professor emeritus of ophthalmology and visual sciences. "When eyes exposed to UVB were treated with the prostaglandins, PGE2 prevented the development of cataracts, and PGF2a failed to do so."

Andley said there is much to learn about prostaglandin synthesis and cataract formation but that it is apparent that prostaglandins, especially PGF2a, are important in cataracts. That discovery is a cause for concern among some ophthalmologists because a derivative of PGF2a is the principal ingredient in a new glaucoma drug.

Most patients with glaucoma have increased pressure in the eye. The standard treatment is to use medications to lower pressure. One such drug, latanoprost, now includes a derivative of PGF2a. It is very good at lowering intraocular pressure, but Becker, a pioneer in the treatment of glaucoma, worries that it might solve one problem while creating another.

Becker admits that most glaucoma patients are elderly and that many might develop cataracts anyway. But he said clinicians should be aware of the potential complications before starting their patients on prostaglandin therapy for glaucoma.

— Jim Dryden



BOB BOSTON

Focusing on diversity

During the School of Medicine Diversity Conference, second-year student Esi Morgan, right, describes her poster on domestic violence in Asian-Pacific-American communities to second-year students Maria Dans and Neal Sikka. The Jan. 11-17 conference, which included a workshop, lunch-time seminars and a cultural fair, focused on diversity issues in physician-patient interactions.

Four School of Medicine researchers named AAAS fellows

Four School of Medicine researchers have been named fellows of the American Association for the Advancement of Science (AAAS). The rank of fellow is the highest awarded by the AAAS, the world's largest federation of scientists with 144,000 members. Fellows must be nominated and voted in by various bodies within the AAAS.

The medical faculty named fellows are: George W. Gokel, Ph.D., professor of molecular biology and pharmacology; Marcus E. Raichle, M.D., professor of radiology, of neurology and of anatomy and neurobiology; Sondra Schlesinger, Ph.D., professor of molecular microbiology; and Robert D. Schreiber, Ph.D., the Alumni Professor of Pathology and professor of molecular microbiology.

Gokel, who directs the Bioorganic Chemistry Program, is a macrocyclic chemist who studies compounds made of rings of nine or more atoms. His research explores the chemical interactions that must occur in the ion channels that are present on all cells and that are involved in the generation of nerve impulses.

Gokel recently received the Izatt-Christensen International Award in Macrocyclic Chemistry.

He also has received the Leo Schubert Award from the Washington Academy of Sciences and an Alumni Award from the University of Miami in Florida. The Japan Society for the Promotion of Science made him a senior fellow.

Raichle heads a pioneering team of Washington University scientists that investigates brain function using positron emission tomography (PET) and functional magnetic resonance imaging (*f*MRI). By analyzing PET and, more recently, *f*MRI data, Raichle and colleagues are mapping with great precision the functional organization of the human brain. Their studies of language processing and other functions have revealed that the brain uses different routes for new tasks and tasks that are familiar.

Raichle has won numerous awards, including the 1992 Decade of the Brain Medal from the American Association of Neurological Surgeons and the Silvio O. Conte Decade of the Brain Award from the National Foundation for Brain Research. He also has been elected to the National Academy of Sciences and the Institute of Medicine.

Schlesinger studies the structure and replication of the Sindbis virus with the hope of developing it into an agent for gene therapy. Her group also is studying the ways the virus commands a host cell to switch from making its own proteins to making viral proteins.

Schlesinger has been involved in numerous societies and professional organizations, including serving as chair of the experimental virology study section at the National Institutes of Health and serving on the American Society for Microbiology's Committee on International Activities in Microbiology.

Schreiber is a leader in determining the mechanism of action of several immune-system proteins known as cytokines and has developed new techniques to study the physiologic roles of these proteins in the body. He and his colleagues have helped define the signaling mechanisms used by a particular cytokine known as interferon-gamma. They have significantly enhanced understanding of the mechanisms used by other cytokines, including interleukin-10, interleukin-1 and tumor necrosis factor. The group currently is evaluating the therapeutic potential of these immune-system proteins.

Schreiber belongs to many professional societies, including the International Society of Interferon and Cytokine Research, where he is an international board member. He also is a past president of the Society for Leukocyte Biology.

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Editor: Michael Slatin, 935-6603, Campus Box 1070

Associate vice chancellor, executive director, University Communications: Judith Jasper

Executive editor: Susan Killenberg

Editor, medical news: Diane Duke, 286-0111, Medical School Box 8508

Assistant editors: Martha Everett, 935-5235, and David Moessner, 935-5293

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Washington
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Washington People

Dacey builds on department's traditions

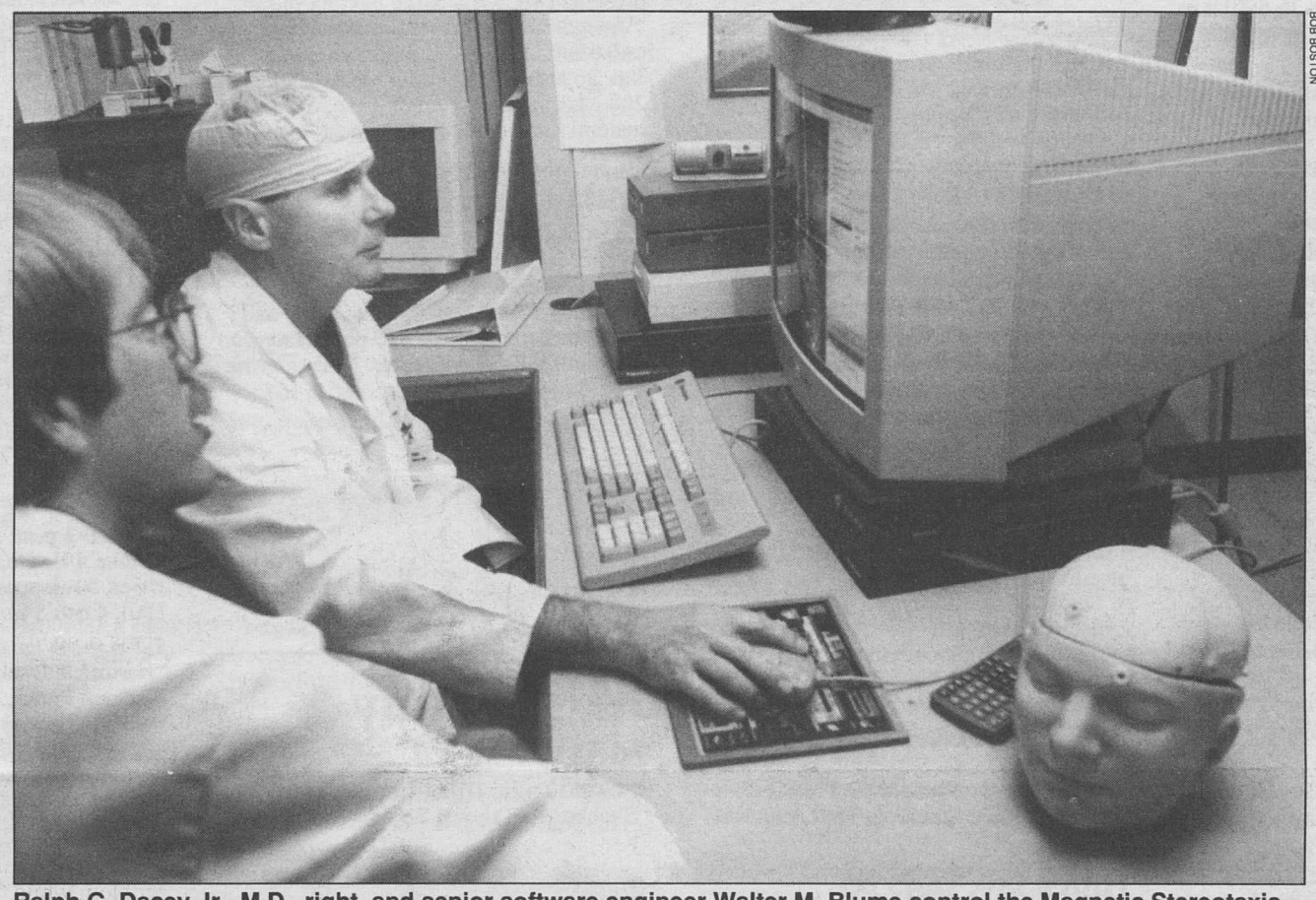
When Ralph Dacey was a medical student at the University of Virginia, his professors knew he would rise to the top of his field. Neurosurgeon John A. Jane, M.D., Ph.D., remembers Dacey coming into his lab to use a microscope for a neurology research project. "I got the idea that I would have to capture this guy," Jane said.

During a subsequent residency in Virginia, Dacey developed the now-standard animal model for testing potential meningitis medications. He later invented a unique way of studying the smallest blood vessels in the brain. "It was also obvious he was going to be a great vascular surgeon," Jane said. "He had a natural ability to visualize solutions to vascular problems."

This ability enables Ralph G. Dacey Jr., M.D., the Shi Hui Huang Professor and head of the Department of Neurological Surgery, to change patients' lives. Among the many people he has helped was a young woman with a malformed blood vessel in her brain's dominant hemisphere. "She decided very courageously to have the malformation removed because she was afraid it would hemorrhage if she became pregnant," Dacey said. "It was heartening when she later had a baby and I was able to attend the christening."

Removing snarled or ballooned blood vessels and sealing those that have burst is Dacey's specialty. As neurosurgeon in chief at Barnes-Jewish Hospital, Dacey performs about 100 such surgeries each year, in addition to many other procedures. His patients come from all over the Midwest and even from the former Soviet Union.

Dacey's interest in the brain's blood supply has led him to study how cells in one part of a vessel communicate with those in another. He also is helping develop a technology that could turn certain types of brain surgery into outpatient procedures.



BOB BOSTON

Ralph G. Dacey Jr., M.D., right, and senior software engineer Walter M. Blume control the Magnetic Stereotaxis System from a computer console.

From Boston to St. Louis

Dacey grew up near Boston, majored in biology at Harvard University and earned a medical degree in 1974 from the University of Virginia in Charlottesville.

During residencies in New York, Virginia and England, he acquired the stamina and skills for operating on the brain. "It's a very delicate organ that does not withstand much physical deformation," he said. "But with extreme care and careful planning, you can intervene and affect someone's life."

Dacey's research during the University of Virginia residency had a major impact on his field. "Thousands of investigators have dedicated their careers to studying the factors that change brain blood flow," said Matthew A. Howard III, M.D., assistant professor of neurosurgery at the University of Iowa. "The experimental techniques all had significant limitations. Dr. Dacey set out with a completely different experimental strategy and successfully developed a means of isolating individual brain blood vessels under conditions of exquisite control. The technique has evolved into one of the most powerful research methods in the field of cerebrovascular physiology."

After faculty appointments at the University of Virginia and the University of Washington in Seattle, Dacey moved to the University of North Carolina at Chapel Hill, where he became the youngest neurosurgery program director in the United States. In 1989, he was recruited by the School of Medicine. "I came to Washington University because this department had been an outstanding mecca for academic neurosurgeons for many years under the leadership of Henry Schwartz and then Sidney Goldring," he said.

Dacey has maintained this reputation, adding new faculty in pediatric neurosurgery, spinal neurosurgery and the neurosurgery of epilepsy and tumors. "It's difficult to continue something that already is very good," said Jane, the David D. Weaver Professor and neurosurgery chair at the University of Virginia. "But Washington University's neurosurgery training program continues to attract top resident candidates and maintains its tradition of being one of the best in the United States."

Marc R. Mayberg, M.D., professor of neurosurgery at the University of Washington School of Medicine, agreed. "The department is one of the premier academic neurosurgical and training programs," he said. "Building upon a strong tradition of basic and clinical excellence established by his predecessors, Dr. Dacey has further strengthened it by emphasizing quality in patient care, clinical research and basic-science research."

The department now is third among neurosurgery departments in grants from the National Institutes of Health.

Dacey also provides constant advice, support and encouragement to younger surgeons, said Howard, who also is an adjunct assistant professor of neurological surgery at the School of Medicine. "He has a remarkable gift for bringing together talented people from all walks of life to form effective multidisciplinary teams to tackle the challenges of a rapidly changing health-care system. Under his leadership, the department is unquestionably at the cutting edge of neurosurgery worldwide," Howard said.

> "I came to Washington University because this department had been an outstanding mecca for academic neurosurgeons for many years. ..."

Dacey's staff appreciates his terrific sense of humor, his immediate grasp of complicated issues and his ability to see the various sides of a question. He also can speak extemporaneously and articulately on almost any subject at hand. On the down side, he works much too hard and does not take enough vacation during the year to relax, according to his colleagues.

Dacey also is active in his field on the national level. For many years, he was an officer of the Congress of Neurological Surgeons, and he served as president from 1994-95. He also is involved with the American Association of Surgeons and is on the editorial boards of Neurosurgery and the Journal of Neurosurgery, the two major journals in the field.

Family is another important facet of Dacey's life. He and his wife, Corinne, enjoy sporting and cultural events in St. Louis and are involved in the education of their 17-year-old daughter, Elizabeth, and 13-year-old son, Ralph III, at John Burroughs School. Dacey also likes to relax on the golf course, and he used to help coach his son's hockey team.

The Magnetic Stereotaxis System

Dacey is helping develop a device called the Magnetic Stereotaxis System (MSS), which originally was conceived by Howard. "It's a totally revolutionary concept — to direct surgical instruments within the body without using manual force," Dacey said.

In human trials later this year, Dacey will insert a small magnet attached to a flexible guide wire and catheter through a pencil-sized hole in a patient's skull. The patient's head then is placed in a cube containing six superconducting magnets. The surgeon controls the small magnet's movements from a computer console that superimposes fluoroscopic images on pre-operative magnetic resonance images. Sitting at this computer, Dacey will use the magnetic field to steer the delivery device as the guide wire pushes it along a preplanned path through the brain. Once the device reaches its target — a tumor — Dacey will insert and then retract a small biopsy tool through the catheter.

This method of sampling a tumor should be less invasive than conventional surgery. Because magnetic forces can steer the delivery device precisely in any direction, surgeons will be able to direct the device along a nonlinear path without passing through functionally important structures.

If the MSS can be used to safely obtain biopsy specimens, the researchers will test it for other applications. These might include the destruction of targeted areas to relieve the tremors and rigidity of Parkinson's disease or the delivery of radioactive implants to a tumor. Eventually, it might be possible to direct therapeutic substances to areas of the brain that are disabled by neurodegenerative disorders. For example, Parkinson's disease could be treated with implants that boost production of dopamine, a neurotransmitter that is depleted in this disorder.

Communication between blood vessels

In his basic research in collaboration with Hans H. Dietrich, Ph.D., research associate in neurosurgery, Dacey studies interactions between the endothelial cells and smooth muscle cells that make up blood vessel walls. The researchers are interested in small vessels in the brain that redirect the flow of blood as different parts of the cerebral cortex become active. This differential blood flow is detected by the positron emission tomography (PET) scanner, which converts it into visual images. It also forms the basis of functional magnetic resonance imaging, the latest tool for studying brain activity.

Using the experimental system Dacey developed in Virginia, the researchers are studying the cellular and molecular mechanisms that allow individual blood vessels to instantly change their diameters and permeability in response to changes in the metabolism of nearby neurons. "We recently found that responses of blood vessels deep in the cortex seem to be integrated over the length of a vessel," Dacey explained. "Moreover, these responses determine how blood vessels upstream regulate their diameters. That kind of communication between blood vessels in the brain has not really been described before."

A four-year grant from the National Institute of Neurological Disorders and Stroke supports this work. The funding recently was renewed for another four years.

Dacey has been a neurosurgeon long enough to know that basic research translates into better patient care. "The challenge to extend some of these findings into the clinical realm, where we can help patients, is very rewarding," he said. "For example, advances in imaging the brain and spinal cord are allowing us to do much more precise work on aneurysms and brain tumors. Similarly, we hope our basic research on blood vessels will lead to better treatments for vasospasm and other conditions."

Dacey also will continue his department's efforts to develop new methods for treating brain injuries, spinal deformities, aneurysms, arteriovenous malformations and tumors. "Continued support of the fine interactions among the neuroscience departments at the School of Medicine is also a priority," he added, "because basic science has so much to contribute to patient care. I feel privileged to work at Washington University, where the faculty, research and facilities are among the best in the world."

— Linda Sage

Calendar

Visit Washington University's on-line calendar at
http://cf6000.wustl.edu/calendar/events/v1.1

Jan. 23–Feb. 1

Exhibitions

"a sabbatical journal: Reflections of Paris." Exhibit documents the spring 1996 sabbatical activities of Carl Safe, assoc. prof. of architecture. Through Feb. 9. Givens Hall. Hours: 8:30 a.m. to 6:30 p.m. weekdays; by appointment on weekends. 935-6265.

"Abstract Expressionism: American Art in the 1950s and '60s." A collection of 20th-century masterpieces by artists of the "New York School." Through April 6. Gallery of Art, upper gallery, Steinberg Hall. Hours: 10 a.m. to 4:30 p.m. weekdays; noon to 5 p.m. weekends. 935-4523.

"Biedermeier in Austria, 1815-1848." Photographic reproductions of art from Austria's Biedermeier era. Part of "Vienna Fest 1997." Through Feb. 21. Dept. of Music Classroom Bldg., located behind Tietjens Hall. Hours: 8:30 a.m. to 7 p.m. weekdays. For weekend hours, call 935-4841.

"The Lens of Architecture: Ronchamp Through Hervé." Architectural photographs by 20th-century photographer Lucien Hervé. Through March 30. Gallery of Art, lower gallery, Steinberg Hall. Hours: 10 a.m. to 4:30 p.m. weekdays; noon to 5 p.m. weekends. 935-4523.

Lectures

Thursday, Jan. 23

1 p.m. Center for Mental Health Services Research seminar. "Use of Aftercare Services Following Intensive Family Preservation Services," doctoral student Marlys Staudt. Room 295 West Campus Administrative Center. 935-5687.

4 p.m. Cancer Center seminar. "Angiogenesis and Apoptosis: Cellular Parameters of Tumorigenesis," Douglas Hanahan, prof. of biochemistry, U. of California at San Francisco. Third Floor Aud., St. Louis Children's Hospital. 362-9035.

4 p.m. Earth and planetary sciences colloquium. "The Ins and Outs of Arc Volcanoes: Sediment Recycling at Subduction Zones," Terry Plank, asst. prof. of geology, U. of Kansas. Room 362 McDonnell Hall. 935-5610.

7 p.m. Architecture lecture. "Designing Livable Cities," Daniel Solomon, architect with Solomon Inc., San Francisco. Steinberg Hall Aud. Part of the Mayors' Institute on City Design: Midwest. *(See story on page 5.)* 935-5342.

Friday, Jan. 24

9:15 a.m. Pediatric Grand Rounds. "Ultra-rapid and Functional MRI," Benjamin C. P. Lee, assoc. prof. of radiology and of pediatrics and chief, Pediatric Neuroradiology. Clopton Aud., 4950 Children's Place. 454-6006.

4 p.m. Music lecture. "Elephants, Murder and Little Green Men: Versions of Melodrama in Prague," Judy Mabary, doctoral candidate in musicology. Dept. of Music Classroom Bldg., located behind Tietjens Hall. 935-5581.

Monday, Jan. 27

4 p.m. Biology seminar. "Sexual Selection and Speciation in Birds," Trevor Price, prof. of biology, U. of California at San Diego. Room 322 Rebstock Hall. 935-6860.

4 p.m. Immunology seminar. "Self-reactive B cell Expansion or Elimination In Vivo: Regulation by CD40, FAS and BCR Signaling," Chris Goodnow, asst. prof. of microbiology and immunology, Stanford U. Eric P. Newman Education Center. 362-8748.

Tuesday, Jan. 28

4 p.m. Anthropology colloquium. "The Role of Social Sciences in Tropical Sustainable Agriculture and Development," Hugh Popenoe, director and prof., Institute of Food and Agricultural Sciences, U. of Florida. Room 149 McMillan Hall. 935-5252.

4 p.m. Diabetes research seminar. "NOS and COX Pathways in Human Glaucomatous Optic Nerves," Arthur H. Neufeld, prof. of ophthalmology and visual sciences. Pathology Library, Room 3723 West Bldg. 362-7433.

Wednesday, Jan. 29

8 a.m. Obstetrics and Gynecology Grand Rounds. "Vulvar Disease in Primary-care Gynecology," Rhonda Cowherd-Wright, chief resident, obstetrics and gynecology. Clopton Aud., 4950 Children's Place. 362-3143.

11 a.m. Assembly Series. Neureuther Library Lecture. "Iron John, Robert Bly, Philip Larkin and Political Correctness," British author Martin Amis. Graham Chapel. *(See story on page 5.)* 935-5285.

1:10 p.m. Social work lecture. "Building Communities From the Inside Out," John Kretzmann, co-director, Asset-Based Community Development Institute, Northwestern U. Center for Urban Affairs and Policy Research. Brown Hall Lounge. 935-4909.

4 p.m. Biochemistry and molecular biophysics seminar. "Design Approaches to Study Protein Structure and Function," Lynne Regan, assoc. prof. of molecular biophysics and biochemistry, Yale U. Cori Aud., 4565 McKinley Ave. 362-0261.

7:30 p.m. Art lecture. Topic to be announced. Robert Kirschbaum, assoc. prof. of fine arts, Trinity College, Hartford, Conn. Steinberg Hall Aud. 935-6500.

Thursday, Jan. 30

4 p.m. Earth and planetary sciences colloquium. "Cenozoic Uplift and Subsidence of Continents and the History of Flooding," Carolina Lithgow-Bertelloni, research fellow, Dept. of Terrestrial Magnetism, Carnegie Institution, Washington, D.C. Room 362 McDonnell Hall. 935-5610.

4 p.m. East Asian studies lecture. "China's Future," Kenneth Lieberthal, the Arthur Thurnan Professor of Political Science, the William Davidson Professor of Business Administration, and research assoc., Center for Chinese Studies, U. of Michigan. Room 30 January Hall. 935-4448.

Friday, Jan. 31

9:15 a.m. Pediatric Grand Rounds. "Abdominal Surgical Emergencies in Infants and Children," Robert P. Foglia, assoc. prof. of pediatrics and head, Division of Pediatric Surgery. Clopton Aud., 4950 Children's Place. 454-6006.

3:30 p.m. Philosophy lecture. "Civilities and Incivilities," Cheshire Calhoun, prof. of philosophy, Colby College, Waterville, Me. Women's Bldg. Lounge. 935-6614.

Music

Wind Ensemble auditions. The Wind Ensemble has openings for trumpet, trombone, saxophone, flute, low-brass and percussion players for spring semester concerts. To schedule an audition, call Dan Presgrave at 872-7181.

Sunday, Jan. 26

3 p.m. Faculty recital. Program includes Franz Schubert's "Arpeggione" Sonata and Johannes Brahms' Sonata in D Major. Features Elizabeth Macdonald, cello, and Hugh Macdonald, piano. Part of "Vienna Fest 1997." Steinberg Hall Aud. *(See story on page 5.)* 935-5581.

Performances

Thursday, Jan. 23

8 p.m. The Performing Arts Dept. presents two avant-garde one-act plays: "Vinegar Tom" and "Hamletmachine." (Also Jan. 24 and 25, same time, and Jan. 26 at 2 p.m.) Drama Studio, Room 208 Mallinckrodt Center. Cost: $8 for the general public; $6 for senior citizens and WU faculty, staff and students. 935-6543.

Friday, Jan. 31

8 p.m. An Edison Theatre "Special Event" in the "OVATIONS!" series features the Merce Cunningham Dance Company. (Also Feb. 1, same time, and Feb. 2 at 2 p.m.) Cost: $23 per person (no discounts). Edison Theatre. *(See story on page 6.)* 935-6543.

Miscellany

Friday, Jan. 24

5:45-6:30 p.m. Hillel Center event. "Shabbat TuB'shevat Seder." A celebration of Shabbat and TuB'shevat with poetry, song, liturgy and light snacks. Sponsored by the Holiday Programming and Teva Project teams. Sign-up required for dinner after the Seder. Hillel Center, 6300 Forsyth Blvd. 726-6177.

Saturday, Jan. 25

8 p.m. Hillel Center event. "Beit Cafe." Bring your mug and friends for an evening of excellent folk music. Co-sponsored by Residential Life. Hillel Center, 6300 Forsyth Blvd. Cost: $6 for the general public; $3 for students with IDs. 726-6177.

Sunday, Jan. 26

12:30 p.m. Hillel Center event. "Welcome Back Brunch." Meet new staff member Rabbi Hyim Shafner and his wife, Sara Winkelman, and enjoy a light brunch. Sponsored by the Hillel Center and the Jewish Student Council. Hillel Center, 6300 Forsyth Blvd. 726-6177.

Wednesday, Jan. 29

11 a.m.-1 p.m. Hillel Center Israel Fair. Jewelry, food and gifts from Israel will be available, as well as information on summer program opportunities. (Also Jan. 30, same time.) Mallinckrodt Center. 726-6177.

Saturday, Feb. 1

10 a.m.-1 p.m. Book arts workshop. "Make a Hardback Book." Martin Brief, book artist. Room 104 Bixby Hall. Cost: $40. 935-4643.

1-3 p.m. "Vienna Fest 1997" event. "Historical Dance Workshop." Led by Kenneth Pierce, instructor of historic dance in Boston and teacher of early 19th-century Viennese dances. Seating is limited. Dance Studio, Room 207 Mallinckrodt Center. 935-4841.

Fieldwork offers practical experience — *from page 1*

like a big muffled explosion," Wiens said. "It was really quite a bit of work — physical and mental — to do the survey."

At the quarry near Alton, the class members used "Betsy" to find the depth of soil that would have to be removed with a bulldozer to reach the limestone below. The students performed computer analyses of the data and wrote detailed reports of all the field projects.

"The class is a good example of exciting research that students can do here at Washington University," said Wiens, who, with Phillips, organized the course and presented it for the first time last semester. "It's open to environmental studies and earth and planetary sciences majors and first-year graduate students. It is designed to provide more field experience in the geology and environmental studies curriculum so students can be better prepared for research and consulting. 'Betsy,' for instance, is frequently used in engineering geology and environmental consulting to image layers below the surface. And the kinds of reports the students wrote up are similar to what they'd be doing on the job."

Prior to the two "Betsy" experiments, the students got a taste of the exotic when they used a magnetometer to painstakingly search the Forest Park golf course between Wydown and Forsyth boulevards for evidence of the legendary Ferris wheel left over from the famous fair.

The project was initiated by Carol Diaz-Granados, Ph.D., research associate and instructor in anthropology in Arts and Sciences. Specifically, the geophysics group sought the Ferris wheel's iron axis, estimated to weigh 50 tons. Local legend has it that the Ferris wheel's remnants were buried in Forest Park because of their bulk and a lack of large equipment to dismantle the pieces.

The magnetometer measures changes in magnetic fields. It is used by industry to find iron ore and hazardous waste drums, for instance. The students loaded the equipment onto an 8-foot-long pole and swept it across the study site. The data were relayed and digitally recorded by a PC-sized machine.

"The magnetometer gives you a contour plot of magnetic field intensity," Phillips explained. "The students worked 10 hours on a Saturday and came up with a signal indicative of eight large metal objects laid out in pairs along a straight line. They are clearly the foundation pieces of the eight struts that supported the axle of the Ferris wheel."

Wiens, Phillips and Shore will offer the class next fall. If word-of-mouth is a good indicator of the class' success, "Earth and Planetary Sciences 454" should fill up.

"This is one of the most practical courses offered. And it was fun, too, using things we've learned and trying to discover whether a local legend is true or not," said Steven Hauck, a first-year graduate student in earth and planetary sciences. Hauck came to Washington University last fall after earning a bachelor's degree in aerospace engineering from the University of Minnesota.

"From an engineer's perspective, the practical, hands-on experience is vital to understanding theory, and it's great for those who're going on in environmental studies to have the actual experience," Hauck added.

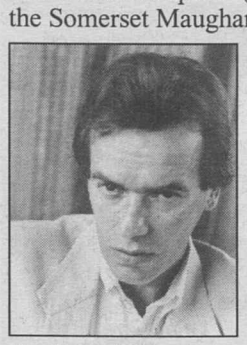
Hauck's classmate Natasha Johnson is an alumna of the University of Arizona. She worked for five years as a solar observer and data analyst at the Mount Wilson Observatory in San Gabriel, Calif., before beginning graduate studies last fall in earth and planetary sciences.

"The course was very valuable because we got hands-on opportunities with the equipment and we learned how the computer modeling works," Johnson said. "The actual data gathering was relatively quick compared with the analysis. The course is challenging. Anyone thinking of taking it should know that it took six whole Saturdays and it's hard work — but well worth it." — *Tony Fitzpatrick*

Postmodern writer Martin Amis to deliver Assembly Series lecture

British novelist Martin Amis will deliver the Neureuther Library Lecture in the Assembly Series at 11 a.m. Wednesday, Jan. 29, in Graham Chapel. His lecture, which is free and open to the public, is titled "Iron John, Robert Bly, Philip Larkin and Political Correctness."

Amis is a postmodern writer who gained acclaim for his debut novel, "The Rachel Papers" (1973), which won the Somerset Maugham Award. Since then, his popularity has grown with the publication of each novel — most notably "Dead Babies" (1975), "Money" (1984) and "Time's Arrow" (1991), which made the short list for the Booker McConnell Prize. Amis' most recent novel, "The Information" (1995), was nominated for the Whitbread Book of the Year, an annual award given to a British or Irish resident for outstanding literary achievement.



Martin Amis

Amis has served as fiction and poetry editor at the Times Literary Supplement and as literary editor at the New Statesman — both British publications. He has contributed reviews to the London Observer, The London Review of Books and The New York Times Book Review and essays to The Atlantic, Esquire, Vanity Fair and The New Yorker.

Amis, the son of renowned author Kingsley Amis, graduated in 1971 from Oxford University's Exeter College with a degree in English with first-class honors. Also in 1971, at age 21, he was hired to write book reviews for the London Observer.

The Neureuther Library Lecture is made possible through the generosity of Carl Neureuther. A 1940 Washington University alumnus, Neureuther was an advocate of lifelong reading and the pursuit of book collecting.

For more information about the lecture, call (314) 935-5285.

NAACP's Mfume to speak

Kweisi Mfume, president of the NAACP, has been added to the list of speakers in this spring's Assembly Series. Mfume will deliver a lecture April 2 in the Martin Luther King Jr. Symposium.

The recently appointed president and chief executive officer of the National Association for the Advancement of Colored People, Mfume served as a U.S. representative from Maryland for five terms. His recently published autobiography, "No Free Ride: From the mean streets to the mainstream," chronicles his rise from a life on the streets to a life as a political leader.

For more information about the lecture, call (314) 935-5285.

Sports

Compiled by Mike Wolf, director, and Kevin Bergquist, asst. director, sports information. For the most up-to-date news about Washington University's athletics program, access the Bears' Web site at www.sports-u.com. Click on "Colleges."

Men's basketball posts win over MacMurray

The Washington University men's basketball team posted a 94-68 victory over visiting MacMurray College (Jacksonville, Ill.) on Jan. 14. Reserve guard Nate Philipp led the Bears with a career-high 19 points.

Current record: 9-3 (1-1 UAA)

This week: 8 p.m. Friday, Jan. 24, vs. Case Western Reserve University (Cleveland), WU Field House; noon Sunday, Jan. 26, vs. University of Rochester (N.Y.), WU Field House

Women's basketball defeats Blackburn

The women's basketball team defeated Blackburn College 80-54 in Carlinville, Ill., on Jan. 14. Freshman center Alia Fischer sank eight of nine shots from the field for a team-high 16 points.

Current record: 10-2 (2-0 UAA)

This week: 6 p.m. Friday, Jan. 24, vs. Case Western Reserve University, WU Field House; 2 p.m. Sunday, Jan. 26, vs. University of Rochester, WU Field House

City design focus of mayors' institute

The School of Architecture again will host the Mayors' Institute on City Design: Midwest, which provides a closed forum for invited mayors to discuss city design strategies with architects and designers.

Sponsored by the National Endowment for the Arts (NEA), the institute will be held from Thursday, Jan. 23, to Saturday, Jan. 25. This is the fourth year the architecture school's Urban Research and Design Center has hosted the conference, which focuses on architecture, landscape architecture, historic preservation, growth planning and management, and urban design and development.

Daniel Solomon, an architect with Solomon Inc. of San Francisco, will deliver the keynote address at 7 p.m. Jan. 23 in Steinberg Hall Auditorium. Solomon's talk, which is free and open to the public, is titled "Designing Livable Cities." Solomon is known for his award-winning work with affordable housing projects.

Each year, mayors of different cities are invited to attend the institute, which includes both presentations on general city design topics and discussions of specific design issues selected by the participating mayors.

The mayors attending this year come from Bessemer, Ala.; Hot Springs, Ark.; Decatur, Ill.; Bettendorf, Iowa; Bowling Green, Ky.; St. Charles, Mo.; and Mansfield, Ohio.

"Mayors have great influence on the physical environment of their cities. This institute is a very effective way of opening their eyes to the possibilities and potential for design improvement in those communities," said Cynthia Weese, FAIA, dean of the architecture school.

John Hoal, institute director and visiting assistant professor of architecture, noted: "Mayors are the focus of the institute because they are uniquely situated to be powerful advocates for good design in their communities. The institute serves as a vehicle for providing support and resources for the increased involvement of mayors in city design, and its aim is to have a positive influence on the livability of American communities."

Hoal also is director of urban design for the City of St. Louis.

> "Mayors have great influence on the physical environment of their cities."
>
> **— Cynthia Weese**

During the institute, Victor Dover, an urban designer and principal with Dover, Kohl & Partners in Miami, Fla., will give a special presentation focusing on traditional urbanism.

Members of the University community playing roles in the institute include Jerome Pratter, LL.M., an affiliate assistant professor of architecture, an attorney specializing in development and a partner at the Stolar Partnership of St. Louis; Thomas L. Thomson, professor of architecture; Michael Willis, a University alumnus and principal with Michael Willis & Associates of San Francisco; Diane Trees Howard, contract and grant coordinator at the architecture school; Mara Minarik, institute coordinator; and architecture graduate students Ian Caine, Greg Galbreath, Mark Magrecki and Simon Yu.

The National Mayors' Institute on City Design was established in 1986 by the NEA in partnership with the University of Virginia School of Architecture, the Jefferson Institute and the U.S. Conference of Mayors. In 1990, four regional institutes were established at universities nationwide.

For information, call (314) 935-5342.

Macdonalds to perform in 'Vienna Fest' recital

The music of Franz Schubert and Johannes Brahms, two composers being celebrated in the yearlong "Vienna Fest 1997," will be featured in a recital at 3 p.m. Sunday, Jan. 26, in Steinberg Hall Auditorium.

Cellist Elizabeth Macdonald, head of the string program in the Department of Music in Arts and Sciences, will perform works originally composed for other instruments. She will be accompanied by pianist Hugh Macdonald, Ph.D., the Avis Blewett Professor of Music.

The program includes "Arpeggione" Sonata, D. 821 by Schubert; Sonata in D Major, op. 78 by Brahms; Hungarian Dance No. 5 in F minor by Brahms; and two piano works by Gabriel Fauré.

The recital is free and open to the public.

For more information, call (314) 935-5581.

Emotional exhibit honors teen — *from page 1*

finally brought himself last December to create the work depicting Jermaine, he said he was unsure how his emotions would play out on canvas.

"I had no idea how I was going to deal with his image — how I was going to face it — but I knew I had to," Hansman recalled.

The deep loss of Jermaine is underlined in the exhibit by a tombstone, designed by Hansman, that also features a variation on the youth's self-portrait. Those visiting the exhibit can leave messages for Jermaine by tying them to paintbrushes beside the gravestone. Hansman said that when he and Jermaine's friends discussed having the grave, they considered whether it would be misunderstood and criticized as morbid or depressing.

"But we decided we couldn't do the show without it. They (Jermaine's friends) took this horrible thing of having a friend in the grave and transformed that into love and beauty. That's what motivates this whole work," Hansman said. "The kids all reached beyond anything they had ever done before artistically and poured their hearts and souls into it."

Other tributes to Jermaine include votive candles, single red flowers and a poem titled "For the lost mind" by 17-year-old Reginald Love. "I'll be shedding tears, for years inside ... Why didn't I get the chance to say good-bye?" the poem asks.

For Hansman, the City Faces program has evolved from him teaching summer classes to being a year-round mentor. At times, he even serves as a guardian angel for the youths, many of whom are surrounded by poverty, crime and drug abuse. He has paid their rent, bought them food and taught one to drive. He frequently visits another who now is in jail. Not wanting to be left out of the exhibit, this youth contributed from his cell drawings of Jermaine.

"When I started with this program, I never thought I'd be burying kids, visiting them in jail, paying their rent, feeding them," Hansman said. "But you can't just go in and teach art and leave. They can't draw if they don't have anything to eat, don't have any heat. We have to take care of the other parts first."

The exhibit also showcases self-portraits by last summer's City Faces participants and features poetry by another youth who died suddenly. The poetry of Kyunia Taylor, a pregnant 15-year-old who was shot to death while riding in a St. Louis school bus last year, describes the violence she faced daily. One of her poems asks: "Why are there gangs and guns all around, And violence with a laughing sound?" City Faces participant Michael Caffey drew a portrait of Kyunia that will be displayed in the exhibit. He plans to sell the portrait and donate the proceeds to Kyunia's mother.

In conjunction with the exhibit, the Bi-State Development Agency's Arts-In-Transit program will display in bus shelters throughout the St. Louis area posters with self-portraits by last summer's class members. The posters also will include such messages from the City Faces participants as "Stand up for what's right even if you stand alone." Note cards of the portraits are being sold to cover the cost of the posters.

In recognition of Hansman's dedication to the City Faces program, he will receive a 1997 Missouri Arts Award next month from the Missouri Arts Council. Last year, the program was cited in a White House report titled "Coming Up Taller." Although honored by these recognitions, Hansman said the true reward has been the youths themselves.

"I've met the most wonderful kids. They've taught me so much," he said. "These kids have given me a whole new life. They have created me."

For exhibit information, call (314) 725-6555.

— Ann Nicholson

EM^3 to develop 'forward-looking' leaders — *from page 1*

For the next two years, the students will meet every other week on Friday afternoon, all day Saturday, and Sunday morning. This allows them to continue working at their companies and commute to classes. (One student is commuting from Chicago.) Students quickly can apply their weekend learning to their weekday jobs, immediately benefiting their employers, who sponsor them.

"This program is really focused on learning that can help us," said Dave Beerbower, an EM^3 student and vice president of safety and quality at Peabody Holding Co. Inc. in St. Louis. "It's not just talk from an ivory tower."

Beerbower expects his career and his company will benefit, especially in terms of applying better analysis to decision-making. Other companies represented in the EM^3 program include Clark Refining & Marketing Inc., Emerson Electric Co., McDonnell Douglas Corp. and Ralston Purina Co., among others.

Each student is matched with several other EM^3 students in a study group designed to facilitate team-oriented, interactive learning. Each team will work on a 12-month integrative project with an actual manufacturing firm. The program also will involve visits to industrial sites in North America and overseas.

"The employee who completes the program will be uniquely positioned to lead his or her company's efforts in developing new products, new markets and new ways of making the company more profitable," said John L. Kardos, Ph.D., academic co-director of the EM^3 program, chair of the Department of Chemical Engineering and the Lucy and Stanley Lopata Professor.

Marcia K. Armstrong, Ph.D., associate dean in the business school and the Vernon W. Piper Director of Executive Programs, said: "We aim to develop world-class leaders in manufacturing — individuals who are forward-looking and able to thrive in the technologically advanced, global business competition of the 21st century. And we'll provide superior support services to help students achieve that goal."

— Nancy Belt

Bobby Cox skipped her way to 15 minutes of fame

Pop-culture icon Andy Warhol said we all have it coming to us — 15 minutes of fame. But when Warhol made that statement, he couldn't have had in mind someone like Bobby Cox, wife of Jerome R. Cox Jr., Sc.D., the Harold B. and Adelaide G. Welge Professor of Computer Science.

In 1952, Bobby Cox performed a feat in less than three minutes that brought her an anonymous sort of fame that has endured for more than four decades. The stunning, sequential image of her as a young woman skipping rope is part of a photographic legacy that occupies a prevailing niche in American popular culture.

The photograph — taken by the late engineer/photographer Harold Edgerton — and others by him were on display at The Saint Louis Art Museum recently. The museum holds 18 Edgerton photographs donated by the Harold and Esther Edgerton Foundation and others from a 1991 gift of Mr. and Mrs. Charles F. Turner.

In the winter of 1952, the newly married Bobby Cox was Edgerton's secretary at the Massachusetts Institute of Technology (MIT). Edgerton, who was an electrical engineering professor there, asked her if she would help him with a photographic demonstration he was planning for a class.

All she had to do was skip some rope.

There were a few minor drawbacks, however. She would have to perform the simple athletic task in a crowded lecture hall in pitch darkness across a series of black-papered laboratory tables. The darkness was necessary to use the pulsating strobe lighting that created a stop-action effect when it flashed. To prepare for the demonstration, Bobby Cox took only one practice run with the lights on before the real thing with the lights off.

"I had complete confidence in 'Doc,'" she said of Edgerton. "The flashes from cameras in the audience and the strobe lights were a bit distracting. It was over very quickly, and he went on photographing four or five others creating different motions. I only skipped across those tables once and had no idea at the time that I was doing anything other than helping my boss."

> "I only skipped across those tables once and had no idea at the time that I was doing anything other than helping my boss."
>
> **— Bobby Cox**

The recent exhibit at the art museum isn't the first time this Edgerton photograph has been displayed in St. Louis.

"About 20 years ago, the photograph and others were on tour, and they were displayed at the old St. Louis Science Center at Oak Knoll," Jerry Cox said. "Our youngest son, Randy, was 10 or 11 and asked us, 'What's Nancy doing in that picture?' He thought the girl was his sister because Nancy then was about the age of her mother when she did the demonstration. He had a hard time making the connection that that was his mother."

Both Jerry and Bobby Cox, who independently were friends with Edgerton before the two met in 1948, credit Edgerton with influencing the direction of their lives.

"I got to know 'Doc' when I took a senior-level electronics course from him in 1946," said Jerry Cox, who, like his friend and mentor, has done remarkable things with speed and light — in the areas of biomedical computing and high-speed fiber-optic telecommunications networking. "I'd given a little thought to teaching, but he was the one who encouraged me, suggesting I go to graduate school."

Bobby Cox had been working as a secretary in MIT's Department of Electrical Engineering when Edgerton asked her to be his secretary. She waited until after her wedding (Edgerton photographed the event) to accept, which she did from Niagara Falls.

"I worked for him for two years, up until our first child was born," Bobby Cox recalled. "He was an excellent boss, and I was exposed to all those famous images and some famous people, too, such as Jacques Cousteau, who collaborated with him on underwater photography."

Jerry Cox and Donald L. Snyder, Ph.D., the Samuel C. Sachs Professor of Electrical Engineering, were influential in Edgerton's receiving an honorary degree from Washington University in 1979.

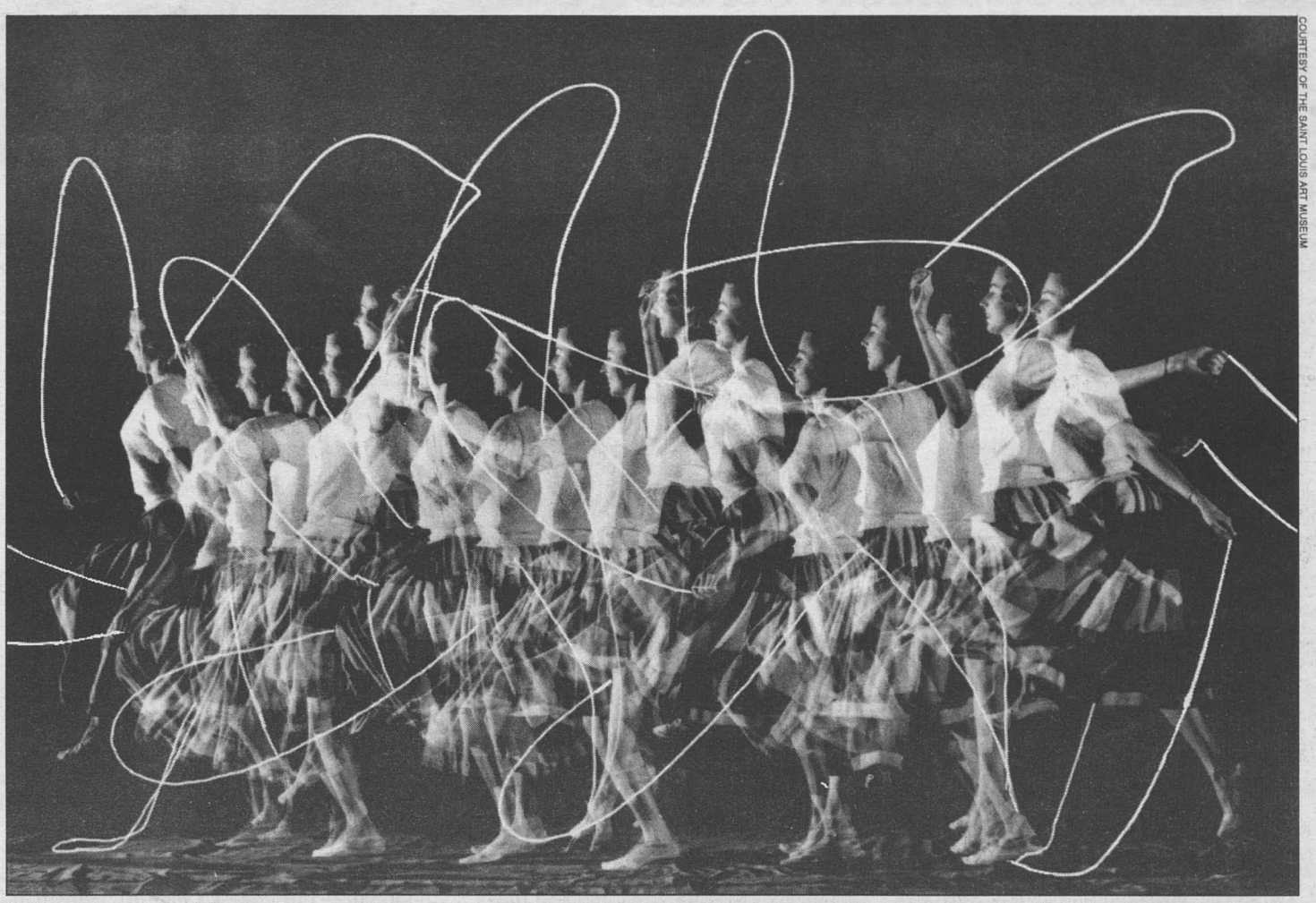
Edgerton, who died in 1990, was highly regarded for his engineering prowess. Combining darkness, speed, timing and light, he invented strobe lighting to photograph the motions of rotating machines. While the technique had many industrial and technological uses, Edgerton quickly saw that his discovery was a springboard to illustrating previously uncaptured motions or phenomena that could not be followed by the human eye.

Edgerton's photographs — depicting everything from a bullet slicing through a playing card, to the "milk coronet" created by a drop of milk in a bowl, to the first evening image of an atomic detonation — gained a foothold in the American conscience. The picture of Bobby Cox skipping rope became a staple of prime Edgerton photographs and has been shown in countless museums, many photography books, The New York Times and revised editions of Edgerton's classic 1930s book "Flash."

The Coxes still look at that one Edgerton photo — titled "Moving Skip Rope" — with wonder and nostalgia.

"We were at the museum and a young man was looking at the picture, and I couldn't help saying, rather awkwardly, 'That's me up there,'" Bobby Cox said. "He looked at me and said, 'I can't believe it.' Well, sometimes I can't either. When I did the demonstration, I never gave it a thought that I'd even see the picture. Shooting images was something 'Doc' did all the time. It's a continuing amazement to us and really something that the picture has a home in St. Louis."

— Tony Fitzpatrick



COURTESY OF THE SAINT LOUIS ART MUSEUM

This 1952 Harold Edgerton photograph, a gift to The Saint Louis Art Museum from the Harold and Esther Edgerton Foundation, shows Bobby Cox skipping rope on top of black-papered laboratory tables in pitch darkness. Edgerton used pulsating strobe lighting to create the sequential images in the photograph, which is titled "Moving Skip Rope."

Merce Cunningham brings unique dance to Edison Theatre for special performances

Merce Cunningham, one of the 20th century's great visionary dancer/choreographers, will bring his remarkable company to Edison Theatre from Jan. 31 to Feb. 2 for a series of performances celebrating 44 years of revolutionary dance.

Cunningham and his company of 16 dancers — renowned for their physical beauty and dancing prowess — will make their Edison premiere in a "Special Event" of the "OVATIONS!" series. The event is co-sponsored by Dance St. Louis.

At 8 p.m. Jan. 31 and at 2 p.m. Feb. 2, the company will perform three recent works: "CRWDSPCR" (1993), "Doubletoss" (1993) and "Rondo" (1996). At 8 p.m. Feb. 1, Cunningham himself will dance with his company in a performance titled "Events," a 90-minute collage of bits of previous dances as well as new material imagined just for the St. Louis performance.

Cunningham has been sending shock waves through the dance world for more than 40 years with works that abandon traditional dance form and structure in favor of a radically new dance vocabulary. He started as a soloist with the Martha Graham Dance Company and performed with the company until 1944. He formed his own company in 1953 as a reaction against the emotional dance dramas created by Graham and other leading choreographers of the time.

He joined minimalist composer John Cage and other avant-garde artists in cutting the arts away from the organizing principles of cause and effect, tension and release. He outraged the dance establishment with works that explored notions of randomness — works sometimes determined by the toss of a coin. Music, lighting and costumes might be chosen without any reference to the dance or to each other. The audience was freed from preconceived ideas about what was happening.

More than 200 dances and 40 years later, Cunningham, now 77, still has the power to surprise, provoke and inspire. Using a computer program to discover human movements never before imagined, Cunningham creates works that derive inspiration from and provide commentary on the digitized language of modern society.

A critic for the Financial Times of London writes of Cunningham's work, "Though its basic nature has probably changed little since the 1950s and 1960s, it remains more profoundly avant-garde than any experimental work being created by new dance-makers."

Tickets are $23 per person with no discounts. They are available at the Edison Theatre Box Office at (314) 935-6543 and at all MetroTix outlets at (314) 534-1111.

Campus Watch

The following incidents were reported to the University Police Department from Jan. 13–17. Readers with information that could assist the investigation of these incidents are urged to call (314) 935-5555. This release is provided as a public service to promote safety-awareness on campus.

Jan. 13

11:22 a.m. — A student returning from semester break discovered that, between Dec. 12 and Jan. 13, a bicycle seat and tool bag were stolen from a bike that was locked to a bike rack on the north side of Koenig Residence Hall. The estimated value is $20.

Jan. 14

3:14 p.m. — A student discovered that, between the evenings of Jan. 12 and 13, $80 was stolen from a wallet that was on a dresser in a Dauten Residence Hall room.

6:20 p.m. — A student returning from semester break discovered that, between Dec. 19 and Jan. 13, a bicycle that was locked to a bike rack on the north side of Liggett Residence Hall was stolen. The estimated value is $400.

Jan. 15

3:15 p.m. — A contract snow-removal company reported striking a parked vehicle, causing minor damage, while removing snow from a parking lot near Simon Hall.

Kardos installed as Lopata Professor

John L. Kardos, Ph.D., professor and chair of the Department of Chemical Engineering, was installed in November as the Lucy and Stanley Lopata Professor in a ceremony in the Lopata Hall Gallery.

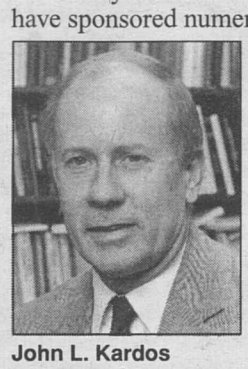
Chancellor Mark S. Wrighton greeted the attendees, and Christopher I. Byrnes, Ph.D., dean of the School of Engineering and Applied Science, presided over the ceremony and introduced Kardos.

Kardos has been on the Washington University faculty for more than 30 years, serving in a variety of capacities. He began as assistant professor of chemical engineering in 1965, rising to professor in 1974 and then chair of the department in 1991.

From 1971 to 1991, Kardos was director of the Materials Research Laboratory and chair of the graduate program in materials science and engineering. His research efforts are primarily in the area of composite materials, including structure-property prediction, interface modeling and material characterization. Kardos' presentation at the ceremony was titled "Composite Materials: Nose Cones to Hip Bones to Bridges for the 21st Century" and traced the transformation of composite-materials use for defense purposes to construction and biomaterials use over the past several decades.

Kardos is active professionally; he holds one U.S. patent and is the author of more than 100 technical papers and five book chapters.

Stanley Lopata — a 1935 Washington University alumnus — and Lucy Lopata have sponsored numerous scholarships and University events and have helped fund construction projects, including the building of Lopata Hall and Lopata Plaza for the engineering school. They have endowed professorships in chemical engineering and in biomedical engineering. They also sponsor the Lopata Classic, the University's annual fall invitational men's basketball tournament.



John L. Kardos

Most recently, the Lopatas endowed a scholarship in the School of Law and provided funding for the courtyard in the George Warren Brown School of Social Work's Alvin Goldfarb Hall, currently under construction.

Both Lucy and Stanley Lopata are active in St. Louis-area community organizations and activities.

Saturday Seminars to focus on memory

Don't "forget" the Saturday Seminars on "memory."

The seminar series, sponsored by University College in Arts and Sciences and its master's of liberal arts program, begins in February and features four lectures by Washington University faculty members exploring the phenomenon of memory and its many uses.

The title of the seminar series — "Memoria Mater Sapientiae" — harkens back to what the ancients called "the mother of the muses and of all wisdom."

Drawn from a variety of disciplines, the speakers will discuss the ways in which memory is a multiple rather than a singular phenomenon; the implications of remembering and forgetting for moral and political life; and the occurrence of remembering things that never happened while forgetting others that did.

Henry L. Roediger III, Ph.D., chair of the Department of Psychology in Arts and Sciences, will begin the series Feb. 1 with his lecture "Cognitive Illusions: Distortions in Perceiving and Remembering." On Feb. 8, Marcus E. Raichle, M.D., professor of radiology, of neurology and of anatomy and neurobiology, will speak on "The Many Images of Memory."

On Feb. 15, James V. Wertsch, Ph.D., professor and chair of the Department of Education in Arts and Sciences, will present "Creating National Memory: The Case of Russia." The series ends Feb. 22 with the lecture "When you see this, remember me ..." by William H. Gass, Ph.D., the David May Distinguished University Professor in the Humanities and director of the International Writers Center in Arts and Sciences.

The lectures are free and open to the public and will be held from 11 a.m. to 12:30 p.m. in Room 362 McDonnell Hall. Registration is not required.

For more information, call (314) 935-6788.

University College offers short courses

This spring, University College in Arts and Sciences will present four short courses on a variety of topics, including the Japanese influence in Western art; science and religion; Jane Austen; and the development of opera.

Elizabeth Semmelhack, who has served as a museum lecturer at The Saint Louis Art Museum, will present the course "Impressionism to Art Nouveau: Japanese Influence in Western Art." In four sessions, the class will explore how the West responded in art to the infusion of culture from the East after Japanese ports were opened to foreign trade in 1853. The course meets from 1 to 2:30 p.m. Wednesdays from Feb. 5-26.

Steven D. Crain, Ph.D., the Witherspoon Fellow in Religion and Science and visiting professor of classics in Arts and Sciences, will offer a four-session course on "Science and Religion." The course will explore the complex relationship between the two powerful forces that shape our understanding of ourselves and our world and will confront the difficult questions for religious belief raised by the progress of science in the last 200 years. Classes will be held from 10 to 11:30 a.m. Mondays from March 10-31.

Amy Pawl, adjunct assistant professor of English and director of expository writing in Arts and Sciences, will teach the course "Jane Austen: The Novels and the Films." In the midst of a revival of Austen's novels through film and television, the course will address one novel/movie pair during each of the four sessions, including "Sense and Sensibility," "Pride and Prejudice," "Emma" and "Persuasion." The class will meet from 10 to 11:30 a.m. Tuesdays from March 11 to April 1.

Hugh Macdonald, Ph.D., the Avis Blewett Professor of Music in Arts and Sciences, and Sue Taylor, Ph.D., lecturer in music, will team up to present "Opera From Its Origins to the 20th Century — the 1997 Season of Opera Theatre of Saint Louis." The four-week class will examine the development of opera as an art form using productions from the local theater company's 1997 season, including Claudio Monteverdi's "The Tale of Orpheus," Conrad Susa's "Transformations," Wolfgang Amadeus Mozart's "Cosi fan tutte" and Giacomo Puccini's "Madame Butterfly." The course meets from 2:15 to 3:45 p.m. Mondays from March 31 to April 21.

Each course costs $80. Students will be notified of course location upon registration. For more information or to register, call (314) 935-6788.

Campus Y presents classes

Tone up your body and tune up your car at the Washington University Campus Y. The Campus Y is offering 10 classes ranging from step aerobics to basic auto care. Other offerings include sign language, body massage therapy, and Trager mentastics — a movement meditation designed to balance and relax the body and mind.

Classes begin Feb. 1 and are open to the general public. YMCA and YWCA members receive a discount on class fees.

For a complete listing of the classes and a registration form, call (314) 935-5010 or stop by the Campus Y in the east basement of Umrath Hall.

For The Record

For The Record contains news about a wide variety of faculty, staff and student scholarly and professional activities.

Of note

R. Keith Sawyer, Ph.D., assistant professor of education in Arts and Sciences, received the 1996 Mouton d'Or Prize for an article titled "The Semiotics of Improvisation: The Pragmatics of Musical and Verbal Performance." An international jury selects one article each year from the journal Semiotica as its prize winner.

Speaking of

Joshua R. Sanes, Ph.D., professor of anatomy and neurobiology, recently delivered the Stephen Kuffler Lecture in Neurobiology at Harvard Medical School. His lecture was titled "Molecular Genetic Analysis of Synapse Formation in Mice." Sanes last spring delivered the Clinton Woolsey Lecture in Neuroscience, titled "Genetic Studies of Synapse Formation in Mice," at the University of Wisconsin.

Guidelines for submitting copy:

Send your full name, complete title(s), department(s), phone number and highest-earned degree(s), along with a typed description of your noteworthy activity, to For The Record, c/o David Moessner, Campus Box 1070, or p72245md@wuvmd.wustl.edu. Items must not exceed 75 words. For information, call Moessner at (314) 935-5293.

Matheson creates comparative literature fund

After retiring last spring from Washington University, William H. Matheson, Ph.D., professor emeritus of comparative literature in Arts and Sciences, created a fund to support his discipline and to honor a colleague, the late Liselotte Dieckmann.

The Dieckmann-Matheson Fund for the Support of Comparative Literature will provide support for graduate students in their study of comparative literature both on campus and during research and language study elsewhere, said Randolph D. Pope, Ph.D., professor of Spanish and chair of the Committee on Comparative Literature in Arts and Sciences.

"Because of the special nature of comparative literature in which students are expected to be familiar with at least two other cultures besides their own, they must use the summers to travel abroad and study foreign languages. The main goal of this fund will be to help our graduate students in this professional development," Pope said. "This is in line with the interest that Bill Matheson has always had in learning foreign languages and celebrating the accomplishments of other cultures."

The fund also keeps alive the name of Dieckmann, who was Washington University's first professor of comparative literature. Dieckmann, who died in 1994 at age 91, was a native of Frankfurt, Germany. She earned a doctoral degree in 1927 from the University of Heidelberg and joined Washington University in 1944. Specializing in 18th- and 19th-century German literature, Dieckmann also was an outstanding comparatist. After her retirement in 1971, she continued to publish a number of studies, critical editions and translations while teaching occasionally and advising those who sought counsel on academic matters.

Matheson was a member of the Arts and Sciences faculty for more than 25 years. He is widely known for the breadth of his courses in comparative literature — teaching on lyric poetry, on the novel internationally, on literature and madness, and on numerous cross-cultural topics involving comparisons of European or American and Chinese or Japanese writings. Among the courses for which he is best known are his seminars on translation involving the many languages he knows.

While recognized as a translator, Matheson also has used his creative energies to write poetry and create pottery. His most recent book, "Sufferings of Light: Selected Poems," is a limited edition containing poems Matheson wrote during the last two decades. A photograph of one of his ceramic works appears on the book's cover.

Matheson became a professor of comparative literature and visiting chair at the University in 1970. Previously, he had taught at Yale, Tufts and Brandeis universities and at his alma mater, the University of Michigan, from which he earned a bachelor's degree in 1951, a master's degree in 1952 and a doctoral degree in 1962, all in French.

He regularly has contributed to the annual holiday pottery sale at the Craft Alliance in University City. His poems have been widely published — locally in River Styx and Webster Review and more far afield in The Avant-Garde Today and in a series of collections titled Anthology, published in Kobe, Japan.

For more information about the fund, call Cynthia Martin at (314) 935-4671.

Obituaries

Ralph E. Pumphrey, social-welfare historian

Ralph E. Pumphrey, Ph.D., professor emeritus at the George Warren Brown School of Social Work and a nationally recognized innovator in community planning, died Thursday, Jan. 9, 1997, at St. Louis' Alexian Brothers Hospital after suffering a heart attack. He was 89.

A highly regarded teacher and social-welfare historian, Pumphrey joined the Washington University faculty in 1959 and served as acting dean of social work in 1964 and as chair of the University Council from 1965-67. He retired in 1976 but remained active at the University and with local nonprofit groups, including Delmo Housing Corp., the Good Samaritan Home and United Church of Christ Neighborhood Houses.

A native of Dayton, Ohio, Pumphrey earned a bachelor's degree in 1928 from Miami University in Oxford, Ohio. He taught history at New York University from 1932-33 and earned a doctorate in English and social history in 1934 from Yale University. He taught a humanities course in Yale's Department of Electrical Engineering until 1937, but volunteer work with the Brooklyn Bureau of Charities spurred his interest in social work.

He earned a diploma in 1940 from the New York School of Social Work (now part of Columbia University) and spent the next 15 years as a researcher and director at social service agencies in South Carolina, New York and Indiana. From 1943-44, he taught physics in the Air Corps' cadet-training program at New York's Syracuse University. From 1956-59, he taught social work at New York University.

He is survived by a son and a daughter and his wife of 62 years, Muriel Pumphrey, a professor emeritus of social work at the University of Missouri-St. Louis. He and his wife collaborated on research that contributed to the development and strengthening of social work knowledge in the United States. The couple also spent three years teaching advanced social work skills in Norway.

His body was donated to the School of Medicine. Memorial contributions may be made to the Ralph and Muriel Pumphrey Scholarship Fund, School of Social Work, Campus Box 1196, One Brookings Drive, St. Louis, MO, 63130.

Opportunities & personnel news

Hilltop Campus

The following is a partial list of positions available on the Hilltop Campus. Information regarding these and other positions may be obtained in the Office of Human Resources, Room 130 West Campus, or by calling (314) 935-5906.

Financial Operations Supervisor 970149. *Housing/Residential Life.* Requirements: bachelor's degree with a major in accounting; three to four years accounting experience; two years supervisory experience; certified public accountant and/or master's of business administration preferred; experience with FOCUS preferred; excellent written and oral communication skills; self-motivated and driven by challenge; ability to meet deadlines with varying degrees of pressure; knowledge of internal controls and various accounting system applications; ability to research and report on accounting and other technical issues; ability to streamline/automate transaction processing and recording; ability to handle confidential information responsibly. Application required.

Programmer/Analyst II 970151. *Computing and Communications.* Requirements: certificate or associate's degree; knowledge and experience with administrative data processing; excellent organizational and communication skills. Application required.

Administrative Assistant, Career Services 970154. *School of Law.* Requirements: bachelor's degree or equivalent experience and education; experience in an academic or legal setting preferred; excellent oral and written communication skills; ability to work well under pressure, to work independently and to exercise sound judgment. Application required.

Public-Service Assistant 970157. *University Registrar.* Requirements: high school graduate with some college; ability to work well with people in a public-service environment; ability to work in a complex network of computer systems.

University Webmaster 970158. *Olin Library.* Requirements: bachelor's degree plus two or more years experience creating and maintaining sophisticated Web sites; thorough working knowledge of Web technology, including HTML, forms design, CGI scripting, Web-authoring tools, image-processing software for scanning and preparing Web-based graphic files, and techniques for converting existing information to Web-based formats; ability to work independently but with aggressive deadlines; experience developing policies and procedures in a diverse institutional setting; experience designing and offering formal technical training to end-users; experience with Windows NT and Microsoft's Internet product suite; knowledge of high-level programming languages like C or C++; knowledge of JAVA programming. Application required.

MBA Records Coordinator 970159. *School of Business.* Requirements: high school graduate; detail-oriented; ability to work independently with minimal supervision; willingness to work occasional overtime or weekends; demonstrated interpersonal and communication skills; ability to maintain the security of confidential information; previous university work experience desirable. Application required.

Programmer Trainee 970160. *Computing and Communications.* Requirements: high school graduate with preference given to applicants who are continuing their education; demonstrated aptitude for computer programming; demonstrated technical awareness; accounting background helpful; willingness and desire to work flexible and extended hours as required; ability to think logically; good organizational skills; ability to communicate orally and in writing. The department will be hiring six trainees to fill future positions within Information Systems. Application required.

Medical Campus

The following is a partial list of positions available at the School of Medicine. Employees interested in submitting a transfer request should contact the Human Resources Department of the medical school at (314) 362-7202 to request an application. External candidates may call (314) 362-7195 for information regarding application procedures or may submit a résumé to the human resources office located at 4480 Clayton Ave., Campus Box 8002, St. Louis, MO, 63110. Please note that the medical school does not disclose salary information for vacancies, and the office strongly discourages inquiries to departments other than human resources. Job openings also may be accessed via the World Wide Web at http://@medicine.wustl.edu/wumshr.

Coder II 960963-R. *Internal Medicine.* Requirements: accredited records technician preferred; experience with medical terminology and medical records; experience with ICD 9 and CPT coding. Responsibilities include reviewing documentation in medical records to determine the appropriate billing codes to be assigned and assisting in ensuring that necessary documentation is obtained and charges are captured for timely billing.

Technician: Sr. Med/Clin/Res 970364-R. *Ophthalmology.* Requirement: bachelor's degree. Responsibilities include providing research and technical support for a project on the molecular and cellular basis in inherited cataract and actively participating in all aspects of lab investigation using advanced techniques of molecular cell biology.

Medical Assistant 970510-R. *Otolaryngology.* Requirements: registered medical assistant; completion of an internship in a medical office; medical office experience preferred. Responsibilities include providing support services to the allergy division and assisting the allergy coordinator in the delivery of allergy injections and patient educational services. Schedule: part-time, two days a week, Tuesdays and Wednesdays. Position located at Barnes-Jewish Hospital's main campus and west St. Louis County office.

Accounting/Payroll/Purchasing Assistant 970534-R. *Anesthesiology.* Requirements: two years of college preferred; one to two years experience in purchasing and accounting; payroll experience preferred; spreadsheet experience; knowledge of FIS and FOCUS programs strongly desired. Responsibilities include providing purchasing, payroll and accounting support for the department; placing and tracking purchase orders; paying invoices; balancing ledgers; entering payroll documents; processing new-employee documents; and assisting with grant processing.

Programmer Analyst II 970536-R. *General Internal Medicine.* Requirements: bachelor's degree in computer science; master's degree strongly preferred; advanced knowledge and three years experience with Macintosh/Windows, JAVA/HTML programming and World Wide Web site construction. Responsibilities include analyzing problems; proposing software system solutions; and designing, developing and maintaining software applications and reusable software components.

Payroll Assistant II 970566-R. *Otolaryngology.* Requirements: associate's degree and/or two years experience in bookkeeping and accounting; experience with on-line payroll processing; knowledge of grants accounting preferred. Responsibilities include overseeing the department's payroll; reviewing all payroll documents; preparing quarterly overtime reports and payroll cost transfers; and maintaining the online asset system and grants list.

Computer System Manager 970571-R. *Molecular Microbiology.* Requirements: bachelor's degree in computer science, electrical engineering or related field or comparable experience; skills in providing technical and non-technical user support; experience with UNIX, Macintosh and Windows; network and programming experience desirable. Responsibilities include performing the set-up, maintenance, design and upgrades of computing and networking hardware/software.

Patient Billing/Services Representative 970581-R. *Neurosurgery.* Requirements: enthusiastic; knowledge of health insurance and managed-care plans; previous experience in physician billing. Responsibilities include obtaining insurance information; assisting patients with the explanation and the updating of insurance and billing forms; overseeing outpatient office registration for patients.

Access Control Coordinator 970608-R. *Protective Services.* Requirements: high school graduate or equivalent with two years of college; knowledge of security industry; working knowledge of computerized reporting; three to five years office experience preferred. Responsibilities include management of the Medical School/Hilltop/West Campus access-control system and set-up and administration of policy and procedures to ensure that routine and specialized access is granted to approved personnel.

Statistical Data Analyst 970612-R. *Psychiatry.* Requirements: master's degree; doctorate in mathematics, biostatistics or statistics preferred; two to three years research experience preferred; fluent in SAS, Dbase or other relational systems. Responsibilities include statistical computing; designing/coding and managing a large-scale biomedical database; and programming and analyzing data using survival analytic and multivariate techniques.

University sets 1997-98 tuition, fees — *from page 1*

of future tuition and room and board increases, depending on the level of participation the family chooses.

The Monthly Payment Plan allows families to spread all or part of an academic year's expenses over 10 equal monthly payments without interest charges.

The following are the 1997-98 tuitions for Washington University graduate and professional programs:

Graduate School of Arts and Sciences and graduate programs in the schools of Architecture and Engineering and Applied Science: The 1997-98 tuition charge for graduate students in these programs will be $21,000, a 5 percent increase over the current charge of $20,000.

School of Art graduate program: The 1997-98 tuition charge for the master's of arts program will be $17,800, a 7.2 percent increase over the current charge of $16,600.

George Warren Brown School of Social Work graduate program: The 1997-98 tuition for the master's of social work program will be $17,100, a 5.9 percent increase over the current charge of $16,140.

School of Law: The 1997-98 tuition for the Juris Doctor program will be $21,675 for first-year students — a 6.5 percent increase over the current charge of $20,350. For continuing students, tuition will be $21,475, a 5.5 percent increase.

John M. Olin School of Business graduate program: The 1997-98 tuition for the master's of business administration program will be $21,800 for first-year students, a 9 percent increase over the current charge of $20,000. For continuing students, tuition will be $21,000, a 5 percent increase. Additionally, for first-year students, a student activity fee of $100 is established. For all students, the $30 career-placement fee is eliminated.

School of Medicine: For medical students enrolling in the fall of 1997, the annual tuition charge will be $28,800 — an increase of 5 percent over fall 1996 entering medical students. (This tuition charge will remain the same for the four years of medical school for these students. In the fall of 1996, tuition for those entering students was $27,435 and continues for the four years of their medical education.)

The following are 1997-98 tuitions for several evening and summer programs:

Undergraduates: For undergraduate students enrolling in University College in Arts and Sciences or continuing education classes in the schools of Art or Architecture in 1997-98, tuition will be $215 per credit hour, an increase of 4.9 percent over the 1996-97 cost of $205 per credit hour.

Graduate studies: Depending upon the graduate program in University College, tuition ranges from $215 to $440 per credit hour for 1997-98 — a 4.9 percent increase over the current range of $205 to $420.

Summer School in Arts and Sciences: Tuition in Summer School classes will be $300 per credit hour for the summer of 1997, a 7.1 percent increase from the 1996 Summer School rate of $280 per credit hour.

Washington University will vigorously pursue the goals of affirmative action

The following letter by Chancellor Mark S. Wrighton reaffirms that Washington University will pursue the goals of affirmative action.

December 2, 1996

Washington University has energetically recruited minority students, faculty and staff for 30 years. During this period, the University has provided education to these students and has benefited greatly from their presence.

In recent times, various programs targeted for minorities have been challenged in legislative bodies and in the courts. The strongest argument used against such programs holds that each individual should be judged solely on his or her own merits regardless of family, economic status, race, ethnic group, religion, or gender. The argument has force because most Americans subscribe to this sentiment.

One can, however, share this conviction and still come to the conclusion that affirmative action programs are right and necessary. The reason is that, historically, our nation has not given equal opportunities to all. Some, by virtue of race or ethnic group, have been excluded from many opportunities, including the best educational experiences. America has been for some years engaged in a sustained effort to right these past wrongs, not with the goal of benefiting any one specific individual but with the goal of building a successful multi-ethnic, multi-racial society that provides opportunities for all. Our country has come a long way, perhaps further than any other nation on earth, but one has only to look around to see that we are not yet where we must be.

The fact that Washington University is a private institution gives us freedom to set and pursue our own goals. With this freedom comes a responsibility to choose courses that we believe to be right and in the best interests of the larger society. Washington University will, therefore, continue its affirmative action policies giving especially high priority to its efforts to attract and educate minorities. We will retain aggressive goals in our student and personnel recruitment programs. We should, and we will, pursue these goals with our accustomed vigor in the hope that Washington University will continue to play its part in building a just, multi-ethnic, multi-racial society that provides opportunities for all of its citizens and serving as an exemplary intellectual community.

Mark S. Wrighton
Chancellor

Washington University
Female and Minority Employees in Each EEOC Category

Job Categories	Total	Male	Female	Minority	% Female	% Minority
	1996	1996	1996	1996	1996	1996
Faculty Tenured	805	710	95	70	11.8	8.7
Faculty Tenure Track	438	320	118	64	26.9	14.6
Faculty Other	1,371	877	494	324	36.0	23.6
Executive/Admin.	1,055	307	748	109	70.9	10.3
Professional	996	308	688	135	69.0	13.6
Secretarial/Clerical	1,824	176	1,648	420	90.0	23.0
Technical	1,766	769	997	511	56.5	28.9
Skilled Crafts	179	177	2	27	1.1	15.1
Service	525	288	237	315	45.1	60.0

AAP (12/96)